Get Started with DAAL Spark samples on Databricks

This is a getting started guide to DAAL-Spark on Databricks. At the end of this guide, the reader will be able to run a DAAL Apache Spark sample application that runs on Databricks.

Step 1 Start a Databricks cluster

Create a Databricks cluster (`Clusters` -> + `Create Cluster`)

Step 2 run initialization notebook

After you start a Databricks cluster, create a python initialization notebook

Init notebook

Step 2.1

Download latest available daal release from github

```
%sh
url="https://github.com/intel/daal/releases/download/2019_u4/l_daal_oss_p_2019.4.007.tgz"
name="l_daal_oss_p_2019.4.007"
wget $url
tar -xzf "${name}.tgz"
```

Step 2.2

Put all necessary sources into appropriate directory

```
%fs
cp
file:/databricks/driver/l_daal_oss_p_2019.4.007/daal_prebuild/linux/daal/lib/intel64_lin/libJavaAPI.
```

```
%fs
cp
file:/databricks/driver/l_daal_oss_p_2019.4.007/daal_prebuild/linux/tbb/lib/intel64_lin/gcc4.4/libt
bb.so.2 /FileStore/jars/
```

```
%fs

cp file:/databricks/driver/l_daal_oss_p_2019.4.007/daal_prebuild/linux/tbb/lib/intel64_lin/gcc4.4/libtbbmalloc.so.2 /FileStore/jars/
```

```
%fs

cp file:/databricks/driver/l_daal_oss_p_2019.4.007/daal_prebuild/linux/daal/lib/daal.jar /FileStore/jars/
```

Step 2.3

Create a directory for init script and create init script itself.

```
dbutils.fs.mkdirs("dbfs:/databricks/init_scripts/")

dbutils.fs.put("/databricks/init_scripts/init.sh","""

#!/bin/bash

sudo cp /dbfs/FileStore/jars/daal.jar /databricks/jars/daal.jar

sudo cp /dbfs/FileStore/jars/libJavaAPI.so /databricks/jars/libJavaAPI.so

sudo cp /dbfs/FileStore/jars/libtbbmalloc.so.2 /databricks/jars/libtbbmalloc.so.2

sudo cp /dbfs/FileStore/jars/libtbb.so.2 /databricks/jars/libtbb.so.2

""", True)
```

Step 3 compile DAAL Sample scala code

Information how to do this can be found in the instructions on how to run dual spark samples. the only difference is that we only need the {Sample} .scala file. for example, only KMeans.scala. You can do this with the following command:

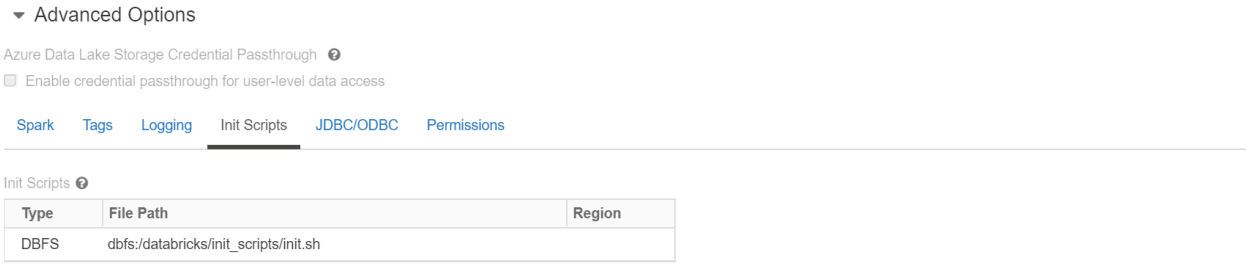
scalac -d daalkmeans.jar KMeans.scala

Step 4 install all libraries

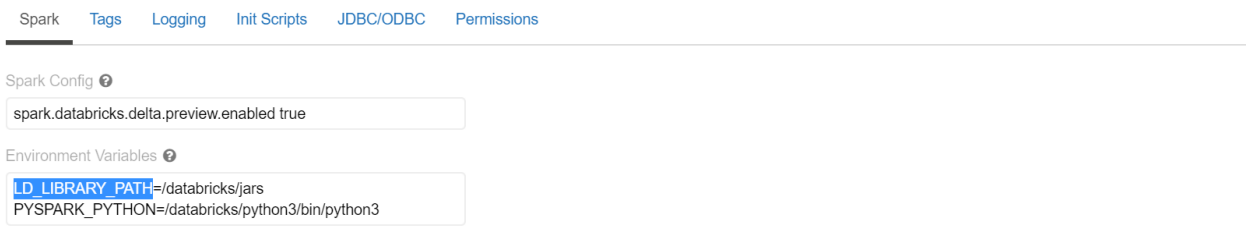
1. Go to "Libraries" tab under your cluster and install dbfs:/FileStore/jars/daal.jar in your cluster by selecting the "DBFS" option for installing jars
2. Install daalkmeans.jar by uploading daalkmeans.jar to DBFS. Select install new and drop daalkmeans.jar into to the appeared window.

Step 5 edit cluster

1. Edit your cluster, adding an initialization script from dbfs:/databricks/init_scripts/init.sh in the "Advanced Options" under "Init Scripts" tab

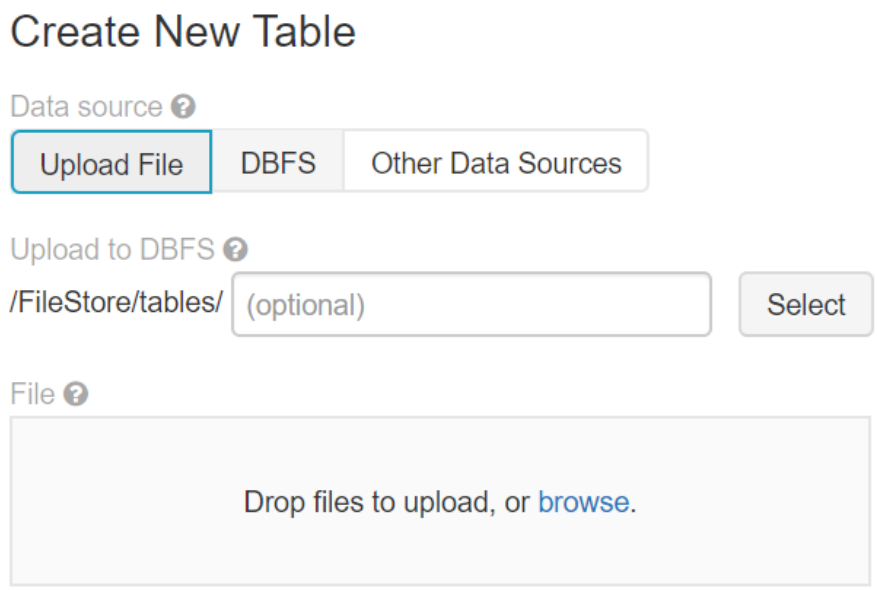


2. Add **LD_LIBRARY_PATH** to environment



3. Reboot the cluster

Step 6 Add test dataset to dbsf



Step 7 create and run new scala notebook

DAAL KMeans Sark Sample scala notebook

Step 7.1

Import all necessary packages

```
import org.apache.spark.SparkConf
import org.apache.spark.SparkContext


//import org.apache.spark.mllib.clustering.{KMeans, KMeansModel}
import daal_for_mllib.{KMeans, DAALKMeansModel => KMeansModel}
import org.apache.spark.storage.StorageLevel
```

Step 7.2

Read test dataset

```
val sc = SparkContext.getOrCreate()
val file_location = "/FileStore/tables/KMeans.txt"
val data = sc.textFile(file_location)
val dataRDD = data.map(s => Vectors.dense(s.split(' ').map(_.toDouble)))
```

Step 7.3

run DAAL KMeans Spark job

```
val nClusters = 20

val nIterations = 10

val clusters = KMeans.train(dataRDD, nClusters, nIterations, 1, "random")
```

If everything was fine you will see all information about intel daal spark job

Step 7.4

Just to be sure, that everything work correctly let calculate sum squared errors

```
val cost = clusters.computeCost(dataRDD)

println("Sum of squared errors = " + cost)
```